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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,011	01/30/2004	Benjamin Y.H. Liu	M419.12-0043	7978

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EXAMINER	
CHANDRA, SATISH	

ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
04/27/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/769,011	LIU ET AL.	
	Examiner	Art Unit	
	SATISH CHANDRA	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/2/3/2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2 - 6, 12, 22 - 24, 26 - 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 December 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/04, 8/05, 12/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Species 1, claims 2 – 6, 12, 22 – 24, 26 - 28 in the reply filed on 2/23/2009 is acknowledged.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 28, 2 – 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al (US 6,409,839) in view of Toda et al (US 6,540,840) and Agarwal (US 6,258,171).

Sun et al discloses: regarding claim 28, a vaporization system for vaporizing material carried in a gas stream (Figs 1 – 11), a heated surface member148, 158, an atomizer 16 (aerosol generator, Fig 9) comprising a first passageway 18 (Fig 11) open to the vaporization chamber 24 (Fig 10). A single liquid source 14 and a single gas source 12 is coupled to the atomizer 16 (Fig 9) wherein the material in the gas stream is vaporized in the vaporization chamber by heat from the heated surface.

Regarding claim 12, the outlet of the vaporizer housing is connected to the process chamber (Fig 9).

Toda discloses: regarding claim 28 and 2 – 6, a plurality of precursor liquid sources 32a – d being connected to the vaporizer (Fig 3), separately controllable via

liquid mass flow controllers 30a – d and a plurality of gas sources 33 (carrier gas) and oxygen source are separately connected to the vaporizer via mass flow controllers (not labeled)..

Agarwal discloses: regarding claim 28, a processing apparatus wherein a plurality of liquid sources 12, 18 are separately coupled to each of the vaporizers 14 and 20.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a plurality of precursor liquid sources connected to the vaporizer separately controllable via liquid mass flow controllers and a plurality of gas sources (carrier gas) and oxygen source separately connected to the vaporizer each comprising a mass flow controller in the apparatus of Sun et al as taught by Toda.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a plurality of precursor liquid sources separately connected to the vaporizer in the apparatus of Sun and Toda as taught by Agarwal.

The motivation for providing a plurality of precursor liquid sources connected to the vaporizer separately controllable via liquid mass flow controllers and a plurality of gas sources (carrier gas) and oxygen source separately connected to the vaporizer in the apparatus of Sun et al is to provide different precursor liquids with controlled flow rates for vaporizing these liquids for film formation in the apparatus of Sun as taught by Toda.

The motivation for providing a plurality of precursor liquid sources separately connected to the vaporizer in the apparatus of Sun and Toda is to provide an alternate

and equivalent arrangement of providing liquid precursors in the apparatus of Sun and Toda as taught by Agarwal.

Claims 22, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al (US 6,409,839) in view of Toda et al (US 6,540,840) and Agarwal (US 6,258,171) as discussed in claims 28, 2 – 6 and 12 above and further in view of Zhao et al (US 6,210,485) and Hillman et al (US 6,548,112).

Sun, Toda and Agarwal were discussed above.

Sun further discloses: regarding claim 22, said outer housing 146 (Fig 11) having walls defining the vaporization chamber, the housing having an inlet (of the conduit flow passage 18) in a first wall open to the first passageway 18 and an outlet in a second wall, a heated surface member comprising a metal block (comprising the housing above the electric heater in Fig 11 and the conduit, conduit being the passageway in the metal block) in the housing spaced from the first wall and the separate bore being aligned with the inlet through which the aerosol is discharged into the vaporization chamber. Sun discloses an orifice 54 (Fig 6) in the atomizer section.

Sun discloses regarding claims 26 and 27, a second metal block in the interior vaporization chamber (central support 148 surrounding the electric heater 158) having a plurality of third passageways 152 therethrough, the second metal block being spaced from the first metal block (and positioned between the first metal block and the outlet of the housing 146 wherein the second metal block has an imperforate surface aligned with the bore in the first metal block to divert gas striking the imperforate surface laterally outwardly toward the third passageways in the second metal block.

Zhao et al discloses: a chemical vapor deposition vaporizer 100 (Fig 5) comprising an orifice 144 in the first metal block directly aligned with the inlet 210 (separate bore through the metal block, metal block being the structure above the gas compactor 208), said orifice forming an opening leading to the separate bore 210 in the first metal block and being positioned to create a negative pressure (intended use of the apparatus) in a space between the first wall and the first metal block such that aerosol discharged from the separate bore at an end remote from the space (space of the passageway 210) is drawn into the space between the first wall and the first metal block through a second .passageways 218, the aerosol droplets being vaporized by heat from the heated surfaces of the individual second passageways in the first metal block. It would be obvious that the vapor entering the passageway 210, circulate after hitting the block (gas compactor) 208 in the space of passageways 210 and 218.

Hillman et al discloses: in Fig 2A, a plurality of passageways 54 and 55 surrounding the bore 51.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a plurality of second passageways in the apparatus of Sun as taught by Zhao and Hillman.

The motivation for providing a plurality of second passageways in the apparatus of Sun is to optimize the vaporizer of Sun for uniformly heating vapor as taught by Zhao and Hillman.

Claims 22, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al (US 6,409,839) in view of Toda et al (US 6,540,840)

and Agarwal (US 6,258,171) as discussed in claims 28, 2 – 6 and 12 above and further in view of Dornfest et al (US 6,082,714) and Hillman et al (US 6,548,112).

Sun, Toda and Agarwal were discussed above.

Sun further discloses: regarding claim 22, said outer housing 146 (Fig 11) having walls defining the vaporization chamber, the housing having an inlet (of the conduit flow passage 18) in a first wall open to the first passageway 18 and an outlet in a second wall, a heated surface member comprising a metal block (comprising the housing above the electric heater in Fig 11 and the conduit, conduit being the passageway in the metal block) in the housing spaced from the first wall and the separate bore being aligned with the inlet through which the aerosol is discharged into the vaporization chamber.

Sun discloses regarding claims 26 and 27, a second metal block in the interior vaporization chamber (central support 148 surrounding the electric heater 158) having a plurality of third passageways 152 therethrough, the second metal block being spaced from the first metal block (and positioned between the first metal block and the outlet of the housing 146 wherein the second metal block has an imperforate surface aligned with the bore in the first metal block to divert gas striking the imperforate surface laterally outwardly toward the third passageways in the second metal block.

Dornfest discloses regarding claim 22, a vaporization system (Fig 15) and teaches the use of a heated metal block for vaporizing an atomized liquid. The heated block 188 of Dornfest is a first metal block that includes a plurality of passageways between fins 178, and a bore aligned with the inlet of the vaporization chamber as

claimed. Dornfest's vaporization chamber also includes a second block 186 having passageways. Recirculation as recited in claim 22 would be inherent at least some degree in the vaporization chamber of Dornfest.

Hillman et al discloses: in Fig 2A, a plurality of passageways 54 and 55 surrounding the bore 51.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a plurality of second passageways in the apparatus of Sun as taught by Dornfest and Hillman.

It would also have been obvious to one of ordinary skill in the art at the time the invention was made to provide a first and second metal blocks in the apparatus of Sun, Dornfest and Hillman.

The motivation for providing a plurality of second passageways in the apparatus of Sun is to optimize the vaporizer of Sun for uniformly heating vapor as taught by Dornfest and Hillman.

The motivation for providing a second metal having a imperforate surface aligned with the bore in the first metal block is to divert gas striking the imperforate surface laterally outwardly towards the third passages in the apparatus of Sun, Dornfest and Hillman.

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al (US 6,409,839) in view of Toda et al (US 6,540,840), Agarwal (US 6,258,171), Zhao et al (US 6,210,485) and Hillman et al (US 6,548,112) as discussed in claims 22, 26 and 27 above.

Sun, Toda, Agarwal, Zhao and Hillman were discussed above.

Sun further discloses: regarding claims 23 and 24, an orifice 54 (Fig 6) in the atomizer section. The diameter of the orifice is smaller than the bore 55. The aerosol forms a gas jet through the inlet.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the same size orifice as that of the separate bore in their apparatus.

The motivation for providing the same size orifice as that of the separate bore in the apparatus of Sun, Toda, Agarwal, Zhao and Hillman is to optimize their apparatus for getting a uniform aerosol spray.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SATISH CHANDRA whose telephone number is (571)272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, Primary Examiner, Jeffrie R. Lund can be reached on 571-272-1437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrie R. Lund/
Primary Examiner, Art Unit 1792

/Satish Chandra/
Patent Examiner
AU 1792, 4/15/2009

Jeffrie R. Lund
Primary Examiner